Flat vs Sloping

Lateral Movement

Summary of Latest Research

- **Incorporating Near-Surface Processes in Modeling Moisture** (Morris, C.E. and Stormont, S.C., 2000)
- **Slope Effects on the Capillary Cover Design for Spent Leach Pad** (Mayer, G.Z., etal., 2001)
- **The Effectiveness of Two Capillary Barriers on a 10% Slope** (Stormont, 1996)

Flat vs Sloping

Study: Incorporating Near-Surface Processes in Modeling Moisture (Morris, C.E. and Stormont, S.C., 2000)

Purpose: Show importance of using near surface processes for modeling moisture movement

Model:

- ***Tracer 3-D model modified for ET using HELP method***
- ***10-year simulation period***
- ***50 m model horizontal length***

Climate:

Albuquerque (8.6 in/yr)

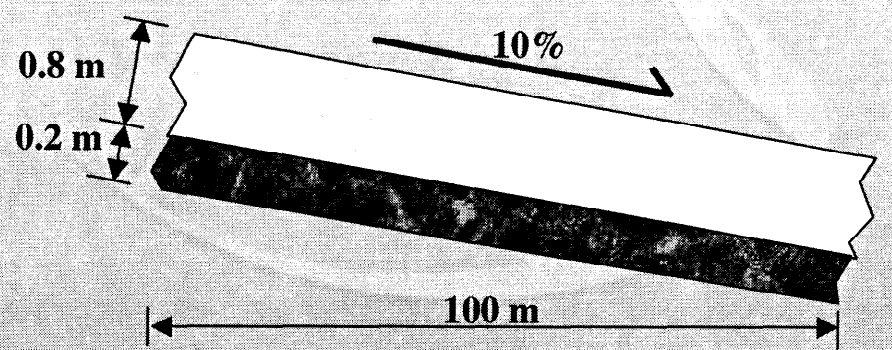
San Francisco (20.5 in/yr)

Chicago (36.2 in/yr)

Columbia (51.6 in/yr)

Conclusion:

- ***transient ET is important near surface process***
- ***modeled drainage length should be longer than 50 m***



COVER SECTION

Flat vs Sloping

Study: Slope Effects on the Capillary Cover Design for Spent Leach Pad (Mayer, G.Z., etal, 2001)

Purpose: Compare 1-D model results with 2-D to determine slope effectiveness

Model:

- ***soil cover used for 1-D, hydrus used for 2-D with evaporation rates from soil cover***
- ***1-year simulation period***

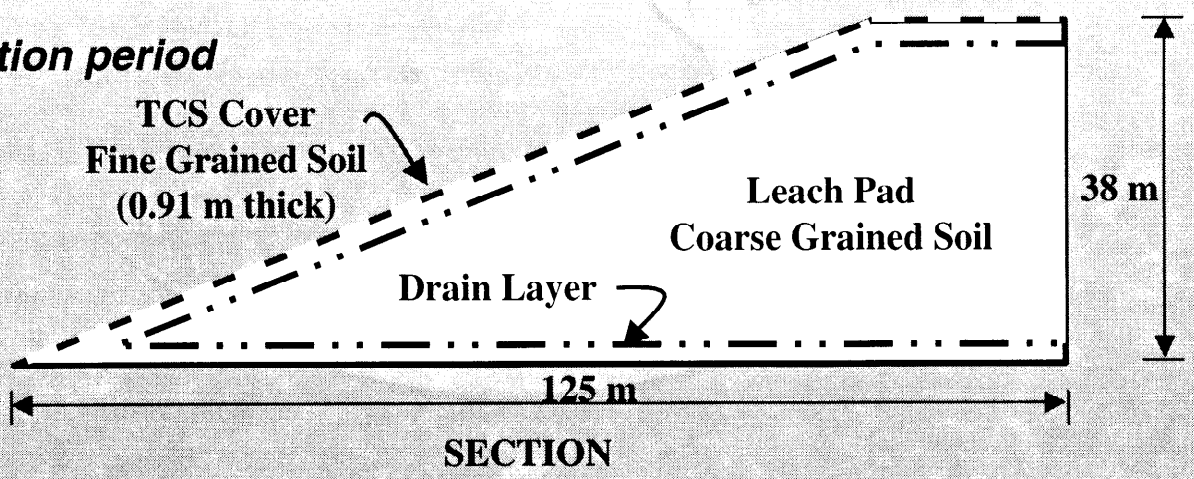
Climate: Elko, Nevada

(7.18 in/yr to 15 in/yr)

- ***normal climate conditions***
- ***extreme climate conditions***

Conclusion:

- ***results from 2-D model confirm 1-D model***
- ***downward flow is not expected to occur on the slope***



Flat vs Sloping

Study: The Effectiveness of Two Capillary Barriers on a 10% Slope *(Stormont, 1996)*

Purpose: Determine effectiveness in a layered and homogenous capillary barrier in laterally diverted water (field test plot)

Model: Field test plot

Climate:

- ***covered with plastic and constant infiltration (9.5 mm/day) for 43 days (homogeneous layer)***
- ***covers removed and plots subject to evaporation and ambient precipitation for 193 days***

Conclusion:

- ***water first produced in drain 6***
- ***by day 22, all drains producing water***
- ***drain 6 produced about 15% more water than attributed solely to infiltration suggesting some lateral drainage***
- ***trend of increasing breakthrough in the down dip direction but failed over its entire length***
- ***substantial diversion can be designed into a capillary barrier as a transport layer***

Flat vs Sloping Summary

- ***Run-off is small with short travel times so downslope effect will be minimal***
- ***2-D hydros model confirmed 1-D soil cover model results for a 3:1 slope***
- ***2-D models and field test plots show a trend in increasing breakthrough in down dip direction during high infiltration with the low ET conditions, but ultimately failure over the entire cover***
- ***All 2-D models had to be modified to simulate near surface ET process***